City-wide $PM_{2.5}$ AERMOD Analysis – Davenport
11/7/08

Conclusions

Davenport direct PM2.5 sources located outside of the nonattainment boundaries proposed by DNR are not predicted to significantly contribute to $PM_{2.5}$ impacts at the location of the Blackhawk Foundry monitor. Blackhawk Foundry is the most significant contributor to $PM_{2.5}$ concentrations at the Blackhawk monitor. Only one other facility may have the potential to cause concentrations at the Blackhawk monitor that exceed all proposed $PM_{2.5}$ significant impact levels (SILs), but this facility is already located within the proposed non-attainment area.

Methodology

A list of all facilities in the Davenport area that reported at least one ton of $PM_{2.5}$ on the 2006 emissions inventory was developed. A total of 18 facilities were included in the analysis:

- Blackhawk Foundry
- Nichols Aluminum - Casting
- Kings Material, Inc - Eldridge
- Alcoa, Inc.
- Linwood Mining & Minerals Corporation
- Kraft Foods Global, Inc – Davenport Plant
- Nestle' Purina Petcare Company - Davenport
- W.G. Block Company - Davenport
- Rich Metals Company
- John Deere Davenport Works
- Quad City Drum Recycling Company
- General Asphalt Construction Company
- PB Leiner USA
- Sivyer Steel
- Midamerican Energy Co. - Riverside Station
- The Schebler Company
- Cargill Salt Division - Buffalo
- Lafarge North America Inc.

Except for Blackhawk Foundry, the facility-wide $PM_{2.5}$ emissions were assumed to be vented through the point source at each facility that was reported to emit the largest quantity of $PM_{2.5}$. Blackhawk Foundry was modeled using the inputs from the previous baseline modeling analysis. The stack parameters and locations of the sources at all other facilities were determined by examining existing modeling for each facility (where available) and from the appropriate construction permits. See the accompanying spreadsheet for a summary of the model inputs. The emission rates used for these facilities are based on the most recent actual emissions data available. In many cases, the actual emissions reported for

$PM_{2.5}$ were the same as those reported for PM_{10} (due to uncertainty of $PM_{2.5}$ emissions from many types of sources). For this reason, this analysis is considered to be conservative.

The base elevation and downwash parameters used for Blackhawk in the previous analysis were retained in this analysis. For all other sources, AERMAP and the appropriate DEM files were utilized to determine the base elevations, and downwash was conservatively excluded. A single receptor was placed in the location of the Blackhawk monitor. The 2005 – 2007 Moline meteorological data were used so the results would line up with the years in which exceedances were monitored. Each facility was placed in its own source group, and output was created for every 24-hour period. The output was imported into Excel, and all conclusions listed here were determined based on post-processing this data (see accompanying spreadsheet).

Results

The highest-eighth-highest (H8H) AERMOD predicted value for all facilities combined is 16.26 $\mu g/m^3$, of which 95% is attributable to Blackhawk Foundry. If Blackhawk Foundry is removed from the analysis, the H8H occurs on a different day, and is reduced to 5.51 $\mu g/m^3$. If all sources already in the proposed non-attainment boundary (Blackhawk, Rich Metals and Nestle Purina) are removed from the analysis, the H8H occurs on yet a different day, and is reduced to only 1.60 $\mu g/m^3$.

On the days where exceedances were observed at the Blackhawk monitor, the vast majority of the modeled concentrations are attributable to Blackhawk (see Table 1). Blackhawk's modeled concentration exceeded the maximum proposed SIL (5 $\mu g/m^3$) on 9 of the 17 exceedance days, exceeded the next lowest proposed SIL (4 $\mu g/m^3$) on 10 of the 17 days, and exceeded the lowest proposed SIL (1.2 $\mu g/m^3$)on all but four of the exceedance days. Rich Metals exceeded the lowest proposed SIL on two of the 17 days, but never exceeded the two higher proposed SILs on any of the exceedances days. No other facilities exceeded any of the proposed SILs on any exceedance day.

The absolute maximum concentration from each facility is summarized in Table 2. The results indicate that four facilities will cause concentrations in excess of at least one of the proposed SILs. These facilities are Blackhawk, Rich Metals, Nestle Purina and Sivyer Steel. Of these facilities only two exceed all of the proposed SILs (Blackhawk and Rich Metals), and both of these are already within the proposed non-attainment area. Nestle Purina is also partially located within the proposed nonattainment area boundary. It is highly likely that the predicted concentrations from Sivyer Steel would be decreased below 1.2 $\mu g/m^3$ if downwash was included at the facility.

Conclusions

This analysis represents a conservative estimate of the impact from the largest emitters of direct $PM_{2.5}$ in the Davenport area. Blackhawk Foundry is the primary contributor on almost all of the days where an exceedance was observed at the Blackhawk monitor during the period from 2005 – 2007. The only other facility whose concentrations exceed all proposed $PM_{2.5}$ SILs is Rich Metals, and this facility is already within the proposed non-attainment boundary. This analysis supports the boundaries used in the current DNR non-attainment area proposal.

Table 1. Predicted Concentrations on Monitor Exceedance Days.

	Observed Concentrations (ug/m^3)	**Modeled Concentrations** (ug/m^3)																	
Date	**Blackhawk Monitor**	**Blackhawk**	**Alcoa**	**Asphalt**	**Cargill**	**John Deere**	**King Materials**	**Kraft Foods**	**Lafarge**	**Linwood**	**MidAmerican**	**Nestle Purina**	**Nichols**	**PB Leiner**	**Quad City Drum**	**Rich Metals**	**Schebler**	**Sivyer Steel**	**WG Block**
2/3/2005	**40**	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
6/24/2005	**37**	13.76	0.00	0.01	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.01	0.36	0.00	0.00	0.02	0.00	0.01	0.00
6/27/2005	**42**	9.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.11	0.00	0.00	0.02	0.00	0.00	0.00
8/2/2005	**51**	3.93	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.02	0.15	0.00	0.02	0.00
9/10/2005	**37**	7.95	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.23	0.03	0.00	0.07	1.47	0.00	0.03	0.01
9/13/2005	**41**	9.29	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.08	0.00	0.00	0.02	0.00	0.01	0.00
12/24/2005	**36**	0.26	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00
11/25/2006	**36**	10.24	0.01	0.00	0.07	0.00	0.00	0.00	0.05	0.02	0.00	0.02	0.10	0.00	0.02	0.23	0.00	0.01	0.00
3/9/2007	**44**	4.28	0.01	0.00	0.00	0.00	0.00	0.00	0.10	0.04	0.00	0.01	0.14	0.00	0.01	0.10	0.00	0.00	0.00
6/16/2007	**36**	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.04	0.00	0.01	0.00
7/26/2007	**36**	9.82	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.04	0.00	0.01	0.13	0.00	0.01	0.02	0.00	0.02	0.00
9/21/2007	**37**	12.73	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.03	0.00	0.01	0.19	0.00	0.00	0.02	0.00	0.01	0.00
11/19/2007	**39**	5.45	0.02	0.01	0.00	0.00	0.00	0.00	0.09	0.10	0.00	0.00	0.31	0.01	0.00	0.02	0.05	0.00	0.07
11/20/2007	**38**	3.57	0.24	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.05	0.11	0.01	0.03	0.00	0.08	0.01	0.17	0.02
12/17/2007	**38**	9.79	0.00	0.00	0.02	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.18	0.00	0.00	0.01	0.00	0.00	0.00
12/19/2007	**57**	0.74	0.19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.00	0.03	0.43	0.01	0.72	0.04
12/20/2007	**48**	0.11	0.58	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06	0.79	0.00	0.00	0.02	1.78	0.08	0.21	0.09

Table 2. Maximum Predicted Concentrations for Each Facility.

Blackhawk	**Rich Metals**	**Nestle Purina**	**Sivyer Steel**	**Nichols**	**Quad City Drum**	**Alcoa**	**WG Block**	**John Deere**	**Cargill**	**Linwood**	**Lafarge**	**Schebler**	**Kraft Foods**	**King Materials**	**MidAmerican**	**PB Leiner**	**Asphalt**
20.17	5..56	2.08	1.90	1.10	0.93	0.72	0.69	0.68	0.37	0.25	0.24	0.23	0.20	0.07	0.06	0.06	0.02